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INDIANA AGRICULTURE.

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AGRICULTURAL RESOURCES AND DEVELOP-  
MENT OF THE STATE.

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THE STRUGGLES OF PIONEER LIFE COMPARED  
WITH PRESENT CONDITIONS.

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WRITTEN BY  
JOHN B. CONNER.

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INDIANAPOLIS, 1893.

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## INDIANA AND ITS EARLY SETTLEMENT.

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The State is in the form of an irregular parallelogram, extending from the Ohio River on the south to Lake Michigan on the north, and lying between the States of Ohio on the east and Illinois on the west. From north to south the average length is about 250 miles and in width about 150 miles. Exclusive of the surface covered by lakes the State has 33,809 square miles, or 21,637,760 acres of land. When the Territorial Government of Indiana was established by the act of Congress in May, 1800, it was an almost unbroken wilderness of heavily timbered forests and undulating, grassy plains. As early as 1702 French explorers had found their way here, but seventy years later the population did not exceed 550 white people, though there were many tribes of Indians. In 1808 the white population numbered about 17,000, and the census of 1810 showed the number to be 24,520. The Indian title to lands, extinguished prior to 1812, released to white settlement only the hill regions of the southern part of the State. This embraced a narrow strip, the Indian Boundary Line, as it was named in the titles, beginning in the Whitewater Valley at the southeast boundary and extending in a northwesterly direction to the Wabash River just north of Terre Haute. All north of this line was held by Indian tribes, and was an unbroken hunting ground, abounding in bear, deer and other wild game. This cession of the hilly regions of the State occurred in 1810. Here agriculture began its struggles with the great forests of white and burr oak, walnut, beech and other timber which abounded, covering the hills and valleys alike. The log cabins of the pioneers were built upon the hilltops. They brought little with them in settlement save the Government price of the land they entered, in 80 and 160 acre tracts, rarely larger in size, because they were poor. With the wild game abounding, and a year

or two of struggle, they were able to maintain themselves. It was rough farming till time elapsed for the roots of the trees to decay, and but little ground was planted and cultivated with the rude spade, rather than with the ruder plow.

In 1816 the Territory had 63,897 population and was admitted into the Union as a State. This gave new impetus to settlement, and new demands were made upon the Indian tribes for the rich lands of the central and northern sections of the State. In 1818 all these were relinquished to white settlement, excepting a small reservation on the Mississinnewa River for the Miami tribe, and a like one on the Eel River for the Potawatamies. This cession was known at the time as "The New Purchase," and it opened up the largest section of heavily timbered and rich lands that had ever been offered for new homes. It was before the day of land speculators, and the tide of people which set in hither from the older States were nearly all home-seekers. The public land sales of this great region opened in October, 1820. There were few purchases of more than 160 acres, most, indeed, for the first year or two, of only half that amount, and happily nearly all by actual settlers. Such density and variety of the forest timber had never before been met with by the settler as that found in the central regions of this new State. The great poplar, oak and walnut timber was supplemented with dense jungles of undergrowth, for here was a moist region, with forty-two inches of annual rainfall. Here was a soil, though level and wet, which promised great fertility and production, equal in all respects to the narrow, rich, river valleys of the hill region. There was no market for lumber, and the valuable forest timber, in the way of cultivation, was made into rails for the fences and destroyed by deadening and burning. Like the first settlements in the hill region, the settlers here rarely had more than surplus enough required to carry them through the first year. The future to them meant hard toil for existence, but they were of stout heart, and, with the abounding wild game, they soon established themselves in rude though fruitful homes.

The first money made by the farmers of Indiana was in growing hogs. The breed was as rough and rude as the country, but the great oak and beech forests afforded the mast upon which they fed and, for the most part, fattened; in these days maturing for market at two years old, instead of in six and



eight months as now. The pigs and cows, with a dozen dollars annually from the sale of the surplus, when there was any market at all, enabled the early settler to make ends meet. It was a very primitive kind of farming in Indiana up to about 1830. There was annually added a large extent of area in fields and cultivation, but there was little market for anything. The Ohio, Wabash and smaller rivers afforded ways out to such markets as there were by steam and flat boat. Wheat and corn were hauled from the interior to these water-ways and markets, seventy-five and a hundred miles; and wheat, between 1830 and 1840, sold at 30 to 50 cents per bushel, and corn, 10 and 12 cents, delivered over long muddy roads. When the Wabash and Erie Canal was opened in 1841, a new era to agriculture dawned. With this, augmented commercial and manufacturing communities had sprung up, whose consumers made larger demands for the surplus agriculture. This new water-way, connecting with the lakes, afforded a line of transportation from the heart of the State to the eastern markets and thence to Europe. This gave a great impulse to the increased growth of the cereals. About this time, also, the railway system began developing quite rapidly. With these improvements building up new communities of consumers, and opening the way to the older ones in the East, diversified agriculture began developing rapidly. The very exclusive hog farming gave way or was supplemented by wider areas in wheat, corn, oats, meadow, etc. Orchards were planted, fruits and vegetables were generally grown, and the privations of pioneer life rapidly gave way to better conditions.

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## THE IMPLEMENTS OF HUSBANDRY.

Previous to 1830 the implements of farm husbandry were rude indeed. Among the first plows used in the State was the bull plow, so named, perhaps, because bulls and oxen were used nearly exclusively to do the plowing; they were slower and steadier than horses, which was important in plowing among the forest roots. The stock or wood-work of these plows were usually crude and rough, made by the farmers themselves who used them. The handles were the butts of

bushes, with the best of crooked roots for the turn in the handles, by which they were held in plowing. The beams were hewn with the axe from small tough oaks. The mould-boards were made from blocks of wood about twenty inches square and three inches thick. The inner and straight side of the mould-boards were fastened to the handle, while the outer surface was hewn out in an irregular troughing shape, much as the present chilled plow is made. The wing of the share extended high up the mould-board, and with it was bolted the sheath. A loop or iron socket was forged and welded inside of the bar into which the wooden sheath or post rested, and in which the head of the large bolt, or colter, which held down the beam, was fitted. With such a plow, on clean ground in good condition, a man with a good team could break about an acre and a half in a day of twelve to fifteen hours. The wooden mould-board had to be frequently cleaned off with a paddle, constantly carried by a cord on the handle of the plow. It required much more labor than it does now, with the improved plow, to do far better work on two and a half acres per day. About 1840 the improved low-winged plow with cast-iron mould-boards came into use. This was the Peacock plow, taking its name from the inventor of it. It was a great improvement over the wooden mould-boards, did far better and more work in a day, had less draft, and was less laborious to man and team. This was succeeded with the steel plow and subsequently with the chilled plow.

In the hill sections of the State, sixty years ago, the plowing was done so as to prevent washing gullies, and so the steep hill sides were plowed along the sides, throwing the furrow down hill, and dragging the plow back to run another furrow in the same way, thus plowing a half acre per day. Now the revolving plow made for hill plowing is quickly reversed to plow either right or left, and hillside plowing is as rapidly done as any other kind.

The V shaped, wooden tooth harrow was the first in use for cultivation. These were made usually by farmers themselves. These harrows at the wide part covered four to six feet of ground. The frame receiving the teeth was made heavy enough to press the harrow into the ground and break the clods. The teeth were ten to twelve inches in length, made of some kind of hard wood and sharpened at the point. They

were very laborious to handle, and were of heavy draft on the teams, and about one-fourth was accomplished with them in a day that is now done far better with improved harrows. The harrow of these early days for cultivation of crops was supplemented with clumsy, heavy single-shovel plows and hoes. With such implements for cultivation four men then did about the work of one now. In these days of scratching merely with the plow and rude cultivation, the saving feature of agriculture was the new and virgin quality of the soil. Natural fertility of soil was fairly productive in spite of poor culture. With such cultivation now it would be quite impossible to produce anything of value. But with improved implements and the proper use of fertilizers, average production per acre is steadily increasing.

Sixty years ago the sickle, or reaping hook, was used nearly exclusively in harvesting the wheat and other cereals. It would astonish the farmer of to-day to see the gymnastic evolutions of the bands of expert harvesters going into the standing grain fields. Reaping grain with the sickle was something one had to learn, to be at all expert at it and capable of cutting a half to three-quarters of an acre per day. Each man cut three and a half to four feet in width for his swath. The first movement was to cast the sickle into the standing grain, compelling it to lean somewhat towards the reaper, and then dexterously throwing forward the left leg, the grain was further led into the desired position, then by throwing around it the right leg and the left arm and hand, it was in position to be cut off by the sickle, ten or twelve inches above the ground, and dropped from the left hand of the reaper into piles. On the return, to rest his back, the reaper, carrying his sickle on his shoulder, properly twisted into his suspender so as to hold it there, he bound into sheaves the grain he had cut through the field, and started in again. Usually from five to ten persons composed these bands of reapers, one man following another, and their gyratory movements at cutting a half acre each per day would be a sight to the driver of the present stately harvester, as, with two horses, he rides, cuts and binds twelve acres of grain per day with ease.

In early days these bands of reapers, with their sickles, composed of a dozen or two young, stalwart men, together would begin their work in the south part of the State, where the

wheat first ripened, and reap the fields northward, thus catching on to the maturing fields as they ripened. The best reapers were paid  $37\frac{1}{2}$  cents per day, or a bushel of wheat, then reckoned an equivalent. About 1840 the grain cradle came into general use, except in the fallen grain, where the sickle was still used. The cradle was a great improvement over the sickle, both as respects the labor and celerity in using it. A good cradler and two binders could harvest and shock about three acres per day.

Previous to 1840 the grain was threshed either with the flail, or was tramped out with horses. Two men could flail out and winnow about twelve bushels per day, and two men and a boy, with horses, could tramp out and winnow about twenty bushels a day. The winnowing, or separating the grain from the chaff, was done by the hand sieve, pouring the mixed chaff and grain from above, two men at the ends of a bed sheet so vibrated it as to make a current of air which blew the chaff to one side, while the heavier grain fell in a pile at their feet. The first threshing machine was introduced into the southeastern part of the State in 1839. With four horses and eight or nine men, two hundred bushels of wheat could be threshed, though it required cleaning afterward, as the threshing machine did not clean it then. It required three men two days to clean and sack what could be threshed in one. This was thought a wonderful improvement over the old way of doing this work. But so greatly has improved machinery followed, that now the same number of persons with the steam power thresher will thresh, clean and sack one thousand bushels of wheat per day. And so might be mentioned the old method of broad-cast wheat and oats seeding, harrowing or brushing in of the grain among the clods, and the other clumsy implements and methods of grain farming in early days. The scythe fifty years ago was used exclusively in mowing the meadows. A good strong man could cut one to two acres of hay per day. The hand rake was then wholly in use to rake up the hay preparatory to stacking with the wooden fork. With the mowing machines of to-day a man cuts ten acres of meadow a day, and with a steel-tooth sulky horse rake another easily prepares it for the stack or mow, and a steel fork handled by a man and a horse does the rest. The first hay press in use was made of a long wooden screw about a foot in diameter, with ten to twelve feet in length

of thread to the screw. A stick of timber twenty-six inches square with a hole through the center served as a nut, with threads cut to receive the wooden screw. The nut was framed into the top of two great posts twenty-six by eighteen inches in size and twenty-one feet long, standing four and a half feet apart, and six feet of these posts were planted into the ground. A space of eleven feet in height was left to receive the hay to be pressed. The sides were closed strongly to the furrowed posts. To the top of the great wooden screw was fastened thirty feet sweeps bent downward, to which horses were hitched. Thus the horses traveled over a mile and a half to turn the screw down to a finished bale of hay, two feet square and three to four feet long. And so our fathers pressed and baled hay at the rate of two tons per day with three men and two horses. Now, with the improved hay press, which costs less, the same labor and time is required to press and bale six or eight tons.

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## THE SOILS OF INDIANA.

The summit lands lying at the top of the divides, or water sheds, are underlaid with a heavy clay. Usually the vegetable accumulation forming the top soil is not deep, but with proper cultivation, drainage and fertilization, are very durable and productive in the growth of meadows and the cereals. This soil is greatly improved by deep plowing and tile drainage to admit the air, and in some localities by a lime dressing, where limestone is absent. The native soils of the beech and oak flats are quite light in color, and for a few years in cultivation were comparatively productive, but were rapidly exhausted. With drainage and proper fertilization these soils are again becoming more productive than ever, and they now grow as fine grain and hay crops as any others. The summit, wet, muck soils, with their years of decaying vegetation, once shunned as worthless, have of late years been reclaimed by drainage and are proving themselves among the very best for nearly all purposes of production.

The undulating uplands, either formerly timbered or prairie, are very much alike. They are both sandy loams, decayed



vegetation appearing considerably greater in the prairie soils, which have a darker color. These lands have a loamy clay subsoil, which retains moisture well, and are much benefited by tile drainage, which admits the air. Much of the fertility of these undulating lands and soils is retained by tile drainage. The surface water, in times of rain, sinks through percolations to the tile, leaving the vegetable loam in the soil, whereas with only open surface drains it would be washed off and lost. These soils are very easily plowed and cultivated, and with about 60 per cent. of fine sand do not bake and become so cloddy as the clay lands. They produce the cereals well, make the best of pasture lands, and blue grass especially flourishes on them. None of our soils produce better crops of wheat than these, and they are very durable, the subsoils usually abounding with the elements of mineral fertility to several feet in depth. When tile drained properly these soils are the very best for orchards and all kinds of fruit growing.

The numerous valleys and bottom lands along the many rivers and water courses afford a large area of alluvial soils. These are made up largely from the rich washings of the hill and undulating lands, before tile drainage became so general. The soils rest usually on beds of gravel and sand, several feet beneath them. The annual overflow of these lands in the early spring season keeps up great fertility. Great crops of corn are annually grown upon these alluvial soils, yielding seventy to eighty bushels to the acre. After they are cultivated several years in corn they produce fine wheat, oats and other small grain crops, but when new these grow too rank and fall badly. These valley lands are generally skirted with what is called second bottom lands, which are frequently much wider in extent, lying higher and with rich, sandy loams upon clay subsoils. These lands are very productive in the growth of wheat, oats, timothy meadow and many other crops.

The prairie soils of the State lie in the northern and north-western sections chiefly. They are underlaid with a heavy clay subsoil, and no lands are improved more by tile draining. These soils are rich in vegetable matter, and contain a very considerable per cent. of fine sand. They are exceedingly productive, producing better corn than any others, unless it is the alluvial first bottom lands. After they are well subdued, wheat,

oats, timothy meadows, clover, blue grass and almost any other crop flourishes upon them.

The central southern tier or two of counties bordering on the Ohio River have a soil peculiar to no other section of the State. The soils here are chiefly made from the rocks by the influence and attrition of the natural forces of frost and water, which in centuries have disintegrated the rocks and combined such vegetable matter as came in contact. In late years with the free use of bone dust and other fertilizers they have become very productive in wheat growing. They produce peaches and other fruits in abundance when there are none grown in other sections of the State. Some of the counties along the Ohio River have become great peach growing districts, the crop rarely ever failing on any account. These lands, formerly thought to be worn and nearly worthless, have lately become productive and very valuable. Many of the soils here rest upon sub-carboniferous limestone, while others are Devonian shale and limestone.

Thus it is seen that the State abounds in soil variety. With proper subduing and reclamation by tile drainage, and the use of fertilizers, rotation of crops and intelligent tillage, it has been found that they all improve in productiveness. Their adaptation to a great variety of crops are noted elsewhere. The purpose here has been to note their peculiarities and character.

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## NATURAL AND ARTIFICIAL DRAINAGE.

At the end of the glacial period, the land embraced within the 300 by 150 miles now comprising the State of Indiana, was nearly a level plain, with an elevation of about one thousand feet above sea level. In the years subsequent the force of the waters from rainfall has made the rivers of the State and numerous lesser water courses, which have become wonderful systems of natural drainage. The Wabash River, rising in the neighboring State of Ohio on the east, flows across Indiana, and forms its boundary on the west for over 200 miles. The elevation above sea level at the Ohio State line is 820 feet, and where it empties into the Ohio, 313 feet. Thus the water has cut away over 500 feet in its course across this original level

plain. The lesser rivers and streams show the influence of the water in about the same ratio to the distance they flow. With the exception of the small sections in the north and north-eastern part of the State, the trend of this flow of water is to the southwest. The small sections referred to are drained by the Maumee River into Lake Erie, and the St. Joseph River into Lake Michigan. As the other greater and lesser rivers approach the Ohio, into which they all empty, the water courses become numerous and larger. As a result of this flow to the southwest, part of the table lands and general surface of the State, once nearly level, have been lowered several hundred feet. The great body of marsh table lands in the Kankakee valley, not yet reclaimed, lie nearly 700 feet above the ocean, 150 feet above the Wabash River, and nearly a hundred feet above Lake Michigan, a few miles distant.

Into the larger rivers of the State, hundreds of lesser streams and water courses have cut their way in deep channels, in every section, affording the best natural drainage for the artificial laterals. Thus it is seen that natural forces have made a perfect system of lateral drainage outlet. When the white man came to the State, he found this splendid condition. But he found among the rich table lands, numerous lakes and marshes and so selected his home among the hill regions of the south. For many years what have since become the richest and most fertile lands of the State, were shunned and deemed worthless. Artificial drainage was not thought possible. Indeed, there was no knowledge of the topography of the State. That the marshy table lands of Central Indiana were 900 feet above sea level and several hundred above the rivers its streams emptied into a few miles distant, were not known or thought of. If it had been, there was neither ability, nor law, nor system for drainage by which one land owner could forge a way through the lands of others into natural outlets. All these came step by step, as all other systems are builded. A law providing for systems of drainage of these rich table lands did not appear upon the statute book till the rich character and value of the lands had been discovered by individual enterprise. Then it was enacted and was from year to year perfected by amendments till now every part of these lands may be readily drained, except the Kankakee marsh regions already alluded



to. Co-operating with the State of Illinois to lower the channel of the river in that State, the first steps have been taken by Indiana to accomplish this.

The open drainage system is rapidly being supplemented by tile drainage in every section of the State where the soil is underlaid with clay. This is especially true of the table lands lying north of an east and west line running twenty miles south of Indianapolis, and of the level lands south of that line resting on clay subsoils. Wherever complete tile drainage has been accomplished, it has nearly doubled the productive capacity of the lands. Under its influence wheat production has nearly doubled per acre. There are now about 30,000 miles of tile drainage in the State, and the work is still progressing rapidly.

The influence of drainage on health has been as valuable as upon production. In 1881 the Indiana Bureau of Statistics made a special inquiry upon this subject and obtained some very interesting facts. In the early history of the State, these table land marshes were malaria pests. A household found it as needful to provide itself with quinine as with other staple necessities. "Chills and fever," as the result of miasmatic influence was termed, was very prevalent in all these regions. For the inquiry to which allusion is made, the Bureau obtained from the books of old practicing physicians, in some of these sections, statements showing the comparative prevalence of miasmatic disease during a series of years before tile drainage, and during a like series of years after the system had been perfected. It was found that the drainage system had decreased disease from this cause fully 60 per cent., and improved healthful conditions by so much. Both medical testimony and hygienic steps have very greatly improved health in every section, and it is now a rare thing to hear the old allusion to "chills and fever" in any part of the State. When the present system of drainage, now going forward so rapidly under the way wisely opened by the statute, is completed, there is no State in these great central valleys that can be more healthful, more productive, or more desirable for residence.

## THE INFLUENCE OF THE RAILWAY SYSTEMS ON AGRICULTURE.

If any one can answer what our State agriculture would do to-day without railroads, he can get some adequate idea of the influence of the railway systems on agricultural production. Previous to the building of railroads in Indiana, the surplus wheat, corn and oats were hauled in wagons from nearly all sections to Madison, Lawrenceburg, Cincinnati and Louisville, on the Ohio river. A little later a good deal of the surplus convenient to the smaller rivers was sent out by flat boats to New Orleans and other river markets. The Wabash, White river, Muscatatuk and other water courses had great reservoirs of water at their sources in early days, and were well supplied most of the year for flat boating. But these facilities to market, so far as convenience was concerned, were limited to the farms within a short distance of the rivers. As the fields were extended the surplus corn in the central sections was much increased, and hog farming grew rapidly, for the hogs could be driven on foot a great distance to market. Cincinnati became the great hog market for nearly all of the State. But wheat, oats and other grain growing was increasing also. There were a few water mills, but they only supplied the home demand, and were what were called custom mills, for grinding the wheat and corn of the farmers residing in a radius of fifty miles. The first flour mill of any consequence was erected at Lawrenceburg in 1839, at the outlet of the Whitewater canal, which afforded a good water power. To this mill wheat was hauled in wagons one hundred and twenty-five miles, as it offered something of a market, the surplus flour being shipped to New Orleans by boats. The wagon roads of those days would scarcely be considered passable now. These trips to market required from seven to ten days and five hundred to seven hundred pounds were considered heavy loads for two horses or a yoke of oxen.

The year 1850 was called the epoch of railroads. The first lines in the State were projected and partly built fifteen years earlier. The building of these roads had a wonderfully stimulating effect on agriculture. Previous to this there was little or no rotation of crops. Year after year the same fields were grown in wheat or corn. Now occurred a wider demand and

greater variety, and crop rotation began. The farm needed the railway and the railway required the products of the farm to be profitable. Here was a rich level country of over two hundred miles, lying between the hill sections of the Ohio river and the great lakes on the north. These physical reasons marked the State as the way of all the great trans-continental lines. It was also in the midst of the belt for the production of the staple breadstuffs of the world. And so over the central and northern sections were built what have become the great railway systems which traverse the continent. These were first constructed as separate lines, and it required many changes and reshipments, and weeks of time to reach the seaboard with the products by rail even, at first. Agriculture received its next large benefits from railroads when the consolidations of these numerous lines were effected. That step reduced freight one-half, and the time required to get to market more than one-half. Whereas it cost the price of a bushel of wheat to take three to market, now it costs less to freight a barrel of flour from Indiana to New York than is required to haul it across that city. The numerous railway lines traversing the State touch all but three of the ninety-two counties, and the system embraces about 6,000 miles within its borders. Nothing that has occurred in the history of Indiana has given a greater impetus to agriculture than railway building. They opened the way for the mills and factories of every kind, and established new markets for the farm surplus near home. And so one great industry gave impetus to another, till we now have a community almost symmetrical in all the essentials necessary to the prosperity of all.

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## DEVELOPMENT IN LIVE STOCK.

The growth and development of this interest has been very marked. Fifty years ago few cattle were kept upon the farms save for milk and butter, and these were of very indifferent breeding. The beef cattle of those days weighed from 700 to 900 pounds, and were reckoned extra when, at four or five years old, weighing 1,000 pounds. At that date the price was considered fair if they sold at one to one and a half cents per pound. Growing hogs was pursued more generally and were

more profitable. The breeds were indifferent also. They required two years or more to mature, and then rarely weighed more than 175 to 200 pounds. In 1840 the packers' standard of weight at Lawrenceburg and Cincinnati was 200 pounds, and from 1840 to the end of 1843 the average price did not reach quite two cents per pound gross. Milk cows sold for \$8, and were thought good if they produced three pounds of butter a week, which then sold at six cents per pound. Horses were also of very indifferent breeding, and were held merely as a necessary animal in farm economy, and those who were able to have them in preference to oxen for this purpose were reckoned somewhat aristocratic. Horses sold for \$30 to \$40 each. A few sheep were also kept of the mongrel breeds, for wool was a necessity for clothing. The wool was carded by hand, made into yarn on the hand spinning-wheel, and woven into jeans and linsey on the hand looms found on almost every well-ordered farm. This was one of the early necessary industries, for there was little machinery in the country then to produce the clothing of the people. These things are mentioned to show what advances have been made in fifty or sixty years. When railroads began to be built there appeared a spirit for better things in live stock, and better blood was introduced rapidly in all lines, though many years previous better cattle, here and there, had been brought into the State from Kentucky and Ohio by new settlers.

Shorthorn cattle of the pure breeds were the first introduced into the State, and to this great breed is due the rapid advance to the front rank, which distinction Indiana now enjoys. The first introduction of these cattle in the State was in 1825 by Mr. Edward Talbott, near Madison, Jefferson County. This was followed by Mr. John Owens in 1828, in Monroe County. The first public exhibit of this breed of cattle was made at the Marion County Fair, held in the old Governor's Circle, now the center of Indianapolis, in 1835. In the following ten years these pure bred cattle were brought into several other counties of the State. The first volume of the Herd Book, published in 1846, did not contain a single pedigree of Indiana cattle, so little attention was then paid to the importance of records of pure breeding. The next volume, published in 1855, had the pedigrees of thirty-five Indiana breeders of these cattle, representing nineteen counties and

something over 137 cattle. From this date Shorthorn cattle were sought for in every section of the State, and the importations from England have been numerous. This great breed soon raised the average weight of cattle throughout the State of from 700 to 900 pounds up to 1,400 and 1,600. Not only so, but it was soon found that grade Shorthorn cattle could be matured at about half the age required by common breeds. There are now about 1,000 breeders of pure Shorthorn blood in the State, with herds numbering over 13,000 animals.

The introduction of other pure breeds are of comparative recent date. Of the other beef breeds may be mentioned the fine herds of Herefords, Polled Angus, Red Polls and Gallo-ways. Of the improved dairy breeds may be mentioned the Jerseys, Holstein-Friesians and Devons. The Jerseys and Holstein-Friesian breeds predominate, and there are fine herds in every part of the State.

In trotting, coach and draft horses, the State stands among the first. Especially is this true of trotting and pacing horses. The standard bred horses of Indiana have a wide reputation, and the blood and breeding are carefully maintained by the associations having these matters in their charge.

Sheep husbandry is most intelligently pursued in every part of the State. The Shropshire, Merinos and South Downs predominating, though there are many flocks of other pure breeds.

Swine herds are numerous, and this line of live stock breeding has been brought more nearly to perfection than any other. The last of the common breeds of swine were abandoned years ago. Poland Chinas, Berkshires, and Chester Whites are the leading breeds, and in about the order named.

Something of the extent and profitableness of the live stock industry is gained from the following table, giving about the average annual number and value of the commercial live stock, and not the studs, herds and flocks of breeding animals.

<i>Commercial Live Stock.</i>	<i>Number.</i>	<i>Value.</i>
Horses .....	725,256	\$53,388,702
Mules.....	56,841	7,733,399
Cattle.....	1,742,278	36,201,886
Sheep.....	1,161,702	4,298,762
Hogs .....	2,586,308	12,787,061
Total.....	6,272,385	\$114,409,810



The growth in value of the live stock industry of the State is seen by comparison with the total values in 1850, which were then \$22,478,555. The rapid increase of this industry is due to several causes, chief of which may be mentioned the central location of the State, its great railway systems, which makes its products so near to the leading markets, and because it is a great corn producing State, and the natural home of the blue grass, making the best, grazing pastures in the world.

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### GRAIN PRODUCTION.

Fifty years ago, without improved farm implements, tile drainage, improved seed and such intelligent cultivation as now, the average yield of wheat per acre was eight to nine bushels, and corn eighteen to twenty bushels. The census reports of 1880 showed that, comparing area in wheat, Indiana stood first, and that has been maintained since generally.

There was a marked increase of grain production when agriculture began to organize, in 1840. The county agricultural societies brought the farmers together annually with their products to compare notes, and learn how to improve their methods of soil culture. In 1851, thirty-three counties had organized these societies and held their annual fairs. From this date there was a marked increase in production per area. In 1850 the State had only 5,046,143 acres of improved land, and of the two staples grew 6,214,458 bushels of wheat and 52,964,363 bushels of corn. The average size of the farms in 1850 was 136 acres, and are now a little less than 100. At that date there were but two or three varieties of wheat grown, and chiefly the Mediterranean. The World's Columbian wheat exhibit of this State has forty varieties, and most of the leading varieties, averaging sixteen to twenty bushels per acre. No fair idea of wheat growing is obtained by the averages of the State, and it is well to explain and understand this. There are two methods of cultivation, wide apart in average yields. The one is composed of a class of farms upon which there is no intelligent method pursued. Tile drainage is neglected, the seed bed is not properly prepared. fertilizers are not used, little or no attention is paid to

the character of the seed put into the ground, and much of it is sown broadcast. This class of farms is found all over the State, and make up a large part of the area grown to wheat. They average from ten to fourteen bushels per acre, and the cost of production is 60 to 80 cents a bushel. The other class comprises the bright and intelligent farmers, who report the cost of production at from 30 to 50 cents a bushel. Their farms are thoroughly tile drained, the seed beds are made perfectly friable, they will have none but the best selected seed, use the best drills, with fertilizer attachments, and they average from twenty to thirty bushels per acre. These are yet in the minority as wheat producers, but they are yearly increasing and raising the annual average, taking series of years as a basis. The same is true of the production of the other staples. The indifferent farming keeps down the average. The following gives a fair idea of the production and value of the staple grain crops of the State:

<i>Kind.</i>	<i>Bushels.</i>	<i>Value.</i>
Corn .....	124,500,000	\$47,400,000
Wheat .....	52,800,000	45,414,000
Oats .....	21,034,000	6,730,000
Total.....		\$99,544,000

In 1840 farm labor averaged, per month, \$8.00; in 1850 it was \$10.50; in 1860, \$12.50, and now, \$18.00 to \$20.00, with board. The relative productivity of farm labor was as follows: In 1840 it took one farm hand twenty-four days to plow, seed and harvest ten acres of wheat, and forty-four days to plow, plant, cultivate and harvest ten acres of corn. Now, with improved machinery and methods, it requires only about three days to obtain the same results that it required ten days then to perform. The figures show the great advances that have been made on the farm in fifty years.

Fifty million bushels of wheat and 125,000,000 bushels of corn and 21,000,000 bushels of oats annually, worth nearly \$100,000,000 seems large for a State the size of Indiana, for its three staple grain crops, but with the present improvement going on, by the time there is a demand for it, the State can produce double the quantity and not trench upon the area of the minor crops, pasture and meadow lands. The minor

grain and seed crops, such as rye, barley, flaxseed, clover, timothy, millet, etc., also yield largely, and the soil is well adapted to their production. But the three great staples best illustrate both the progress of agriculture, in the lines of grain production, and the capability of our soils for this purpose.

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## INFLUENCE OF PURDUE UNIVERSITY ON AGRICULTURE.

The act of Congress of 1862, laying the new foundation for agriculture, was the most important step in behalf of this great industry, taken in all its history. Indiana availed herself of the endowment, but like the Congressional enactment, it was feeling the way in the dark, and the struggle to a knowledge of the wonderful advantages now afforded by this agricultural college has been a great one, though not exceptional to this State alone. In the dark days of the struggle for national existence and integrity, Congress builded better than it knew. The same may be said in behalf of other States which accepted the endowment and organized these agricultural and industrial colleges. Projected into new fields of learning, they found the State, and all the States, without trained instructors to this bent, and the people almost wholly incredulous respecting the utility of such schools. There were chemists and others qualified in theory and practice to meet the public demands, so far as the public had discovered the need of them. But applied science in agriculture was Greek to the general farmer. Johnson and others had long before written well, but few had learned to apply this science to soil culture. And it was under these disadvantages that Purdue University began its work. All educational institutions had led the student away from manual industry. Literature and professions had long been the outcome of the colleges, and it is therefore not to be wondered at that the general newspaper added to the public confusion by its jeers at "educating for the farm." The agricultural press, which supported the new movement, was then in its minority in all the great agricultural States, and had small voice or influence. It is a remarkable fact, that the press devoted to agriculture began



its growth and influence about the same time, and its circulation among the agricultural classes has grown more since 1862 than it had in all time before. This growth and desire for agricultural information was the sure promise of the final success of the agricultural and industrial colleges.

Purdue University now has its graduates in every part of the State, and in many newer States, developing the same work. In our own State they can be named in every section as the brightest and most successful farmers. The public have come to understand that applied science in farming is one of the most important steps of the century, that national prosperity which has been so prevalent in the last decade or two is due largely to this movement.

The public support of this college of applied science for several years was meager. Legislatures were made up of the same unappreciative class. But it has come to be understood that the prosperity of all depended upon intelligent industry. The things that have actually occurred under the direct influence of Purdue University have year by year wrought this change. The experiments in growing wheat at the University farm have attracted the attention of nearly all the other States. These experiments have shown how the yield may be doubled on the same lands, and how this staple may be produced at a cost of thirty cents per bushel. Like experiments with other seeds and productions have also wrought new things for agriculture. Methods of cultivation have also been of equal advantage to this industry. Periodically the bulletins showing this work and its results are sent into all parts of the State. As auxiliary to the work of the University, Farmers' Institutes were, a few years ago, organized under charge of one of its faculty. The value of these have been most marked in breaking down a lingering prejudice to agricultural education. The gospel of agriculture under these organizations has been carried to the doors of the people in every county of the State. This has awakened new interest in both agriculture and in the institution which is doing so much to promote it.

Purdue University has a school of agriculture which has been established in response to a popular demand that there shall be a school of high grade in which young men coming from the farm, and who expect to return to the farm, shall be given a liberal education, and also practical instruction and

experience in the higher forms of applied agriculture. This school is not a school of high agricultural research. Such work must be done in an advanced school of science. Purdue has such a school, and from it has come some of the best workers in agricultural research in the country.

This school lays a foundation for scientific research broadly and generously. The backbone of this course is composed of chemistry, botany, zoölogy and geology. It attracts a class of men who would never think of taking a course in agriculture, and whose purpose is not to return to the farm. Although this school, in its first years, is a school of general science, its purpose is to lay a foundation upon which men can be trained into the practical, productive industries in which science plays an important part, and very strong effort is made to influence men who are in this course to turn their attention to the higher departments of agricultural research.

The strongest men we have had in our school of science have been turned toward agricultural research as a profession, and these are the men who have most distinguished themselves and reflected the most credit upon the University. Although they are now among the most devoted followers of agricultural science, it is safe to say that, with one exception, none of them would have entered a school of agriculture nor a school of agricultural science, so called. Why? Because people still believe that science has to do with every department of work except the farmer's work. They have not yet comprehended the great fact that the widest field for the scientist of to-day is the field of agriculture and its allied subjects. These young men did not comprehend it. They discovered it after they entered the Purdue School of Science.

We thus have a school of practical agriculture which sends its graduates back to the farm. We also have a school of science, which sends many of its graduates out into the greater and broader domain of agricultural research. No well informed person will dare say that this work is not a noble one, and that it is not productive of the highest economic results to the practical agriculturists of the country.

To determine quality of soils and adaptation to production, branch experiment stations have been established in all quarters of the State under proper management and direction.

These branch stations, together with the main one of the University farm, are doing a two-fold work, that of awakening new interest in better methods, and determining the value of new seeds, fruits, etc., and their adaptation to sections. The silent forces and influences going out from this institution and permeating all the industrial classes, touches the mainsprings of productive industry, upon which rests the general prosperity.

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## GENERAL FEATURES OF INDIANA AGRICULTURE.

Let any one interested in the general subject of agriculture consider the location of the State and its contiguity to the great cities of the West, which teem with their millions of consumers, affording better and better markets for our surplus. The census returns of 1890 show a rapid increase of manufacturing industry and of population of all these cities, and the consequent larger and larger demands upon the farm, its dairies and horticulture. Ten years ago there were but half a dozen organized associations; now they are found in every part of the State, and hundreds of thousands of dollars have been invested in them. The productions of vegetable garden and small fruit farming have quadrupled in the same time. The soil and climate of the State are well adapted to all the fruits of the temperate zone. The Ohio River counties have thousands of acres devoted to successful peach culture, while the northern sections produce as fine apples as are found anywhere. The smaller fruits flourish in all sections. A State adapted to such variety of production, situated in the midst of great and growing industries, has not entered too soon upon the more intelligent methods of soil culture. So surrounded, and so apprehending our advantages and coming demands upon us, a more intensive system of agriculture is rapidly taking the place of the extensive and wide area of cultivation. It has already been shown how the applied science of agriculture has more than doubled the production of the staple crops. Under the management, in many sections, one acre is producing what two formerly barely did. The lands are yet comparatively cheap to those who know how to manage them.

Thousands of acres wait cultivation still. The annual agricultural production is over \$200,000,000 in value, with about 33 per cent. of our arable lands yet producing nothing. Here is wide opportunity to the industrious and skilled, in whatever branch of agriculture he may desire to engage. Great railway systems, assured and convenient markets, constantly enhancing values of land, rapidly increasing demands for all that is produced. These are the conditions prevailing in a State now in the center of population, and in the very heart of the richest agricultural resources of the United States.









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